REMARKS

Previously, the above-captioned patent application was filed with 31 claims. All of the claims stand rejected. Applicant hereby cancels claims 1, 3, 8 through 10, 21 and 28 through 32. Applicant adds claims 33 through 37. Claims 22, 33, 36 and 37 are in independent form.

The Examiner has set forth several objections to the claims. Applicant has made every endeavor to correct the issues presented in the objections without adding new matter. Therefore, Applicant respectfully traverses the objections.

Claim 1 stands rejected under 35 U.S.C. §102(a) as being anticipated by a publication entitled "Quasi-Constant Envelope OQPSK Through Non-Linear Radio And AWGN Channel," proceedings of IEEE MILCOM, 7-10 October 2002, Volume 1, pages 715-720 (the Liu reference). Applicant respectfully traverses this rejection.

Applicant respectfully traverses this rejection because the Liu reference cannot be used as a 35 U.S.C. §102(a) reference because, if this reference states what the Examiner believes to be the invention, then the Liu reference was not a printed publication "***before the invention thereof by the Applicant for a patent***." More specifically, if the Liu reference describes the invention, then Liu invented the invention before the publication was printed. Therefore, Applicant respectfully traverses this rejection.

While Applicant believes that the Liu reference is not prior art for the above-captioned patent application, Applicant would like to point out that the discussion found in the Liu reference is primarily for class C power amplifiers only. This can be substantiated when viewing equation 3 found on page 716. Applicant's invention in the above-captioned patent application relates to a communication system and a transmitter that incorporate the use of power amplifiers that are Class F, Class E, Class D, Class C, or any of Class A, Class B, and Class AB working in the saturated region. Applicant's invention is capable of operating in all of these classes of power amplification because the pulse shaping function and the impulse response function are convoluted. By convoluting these functions, the modulation and amplification of the signal being transmitted by the transmitter can be properly down converted and demodulated by a receiver because the affects of the modulator and the amplifier are predicted.

Further, while the Liu reference discloses a direction in which an engineer should take, the answer that is described in the above-captioned patent application is not given in the Liu reference as is was not known at the time of the preparation of the paper and the proceedings. Referring to the sentence directly below equation 8, "[t]herefore, the signal-to-distortion power ratio can be maximized by minimizing the power of $y(t)$ through choosing the appropriate shaping pulse {p(t)}." This sentence shows the signal-to-distortion power ratio can be maximized by choosing an appropriate shaping pulse, it does not give what that shaping pulse is. The above-captioned patent application describes how to maximize the signal-to-distortion power ratio by giving the appropriate shaping pulse.

Further, while Table 1 on page 717 of the Liu reference identifies the signal-to-distortion power ratio based on L symbols and roll-off factor β, it does not illustrate which range in optimal and why. Therefore, Applicant respectfully traverses the rejection of the remaining claims and the new claims under the Liu reference because the Liu reference does not disclose the invention as set forth in claims 22, 33 and 36. Therefore, Applicant respectfully traverses these rejections.

The Examiner has also combined the Liu reference with United States Patent 6,470,055, issued to Feher on October 22, 2002 (the '055 reference). Applicant respectfully traverses the use of this combination of references.

The '055 reference discloses an implementation wherein "Modulation and Demodulation filters have been implemented and tested with intentionally Mis-Matched (MM) filter parameters," (column 19, lines 2-4). This discussion of MM filter parameters extends for several columns. In addition, the '055 reference requires two stages of filters for each of the transmitter and receiver (see elements 6.6, 6,8, 6.11, 6.12 in transmitter and 6.26, 6.27, 6.30 and 6.31 in the receiver). These facts clearly demonstrate that the '055 reference teaches away from that which is disclosed in the Liu reference and the above-captioned patent application. Applicant asserts that it is improper to characterize the '055 reference as prior art.

Applicant would like to point out that the '055 reference discloses "the amplifier may be operated in a fully saturated mode, designated as Non-Linear Amplifier…," (column 13, lines 55 et seq.). Applicant strongly suggests that the Examiner discount this type of language because Feher included no discussion in the '055 reference as to how such an amplifier would work. Saying it could happen is not a disclosure and should not be a bar to Applicant's invention. Further, the '055 reference does not disclose the characterization of the amplifier by an impulse response function. Claim 33 specifically requires same.

Claim 33 is introduced with this amendment and is designed to replace claim 1. It claims a system for communication. The amplifier is used in the saturation region and defines an impulse response function. Nowhere in the references cited by the Examiner nor discovered by the Applicant shows an amplifier working in its saturation region and having an impulse response function. Amplifiers are characterized by designed gain (AM/AM or AM/PM). Amplifiers in the prior art are not designed by an impulse response function. The amplifier claimed in claim 33 is designed to have an impulse response function that convolves the pulse shaping function of the modulator. This allows the amplifier to work in the saturation region. Therefore, claim 33, and all claims depending therefrom, overcome any rejection made based on the references cited by the Examiner or discovered by the Applicant.

Claim 22 stands rejected under 35 U.S.C. § 102(a) as being anticipated by the Liu reference. Applicant respectfully traverses this rejection. The Liu reference is discussed above and the assertion that the Liu reference is an improper 102(a) reference is hereby re-asserted.

Claim 22, as amended to clarify the invention, claims a method for minimizing distortion caused by a saturated power amplifier. The method includes the steps of mapping bits, feeding a coefficient to a first finite impulse response filter, and feeding a coefficient to a second finite impulse response filter, wherein filtering of the in-phase signal and the quadrature signal with a pulse shaping function is defined by the equation:

$$x(t = kT_s) = \begin{cases} 1 & \mathit{If}\ k = L \\ 0 & \mathit{Else} \end{cases}.$$

The Liu reference does not disclose the combination of steps set forth therein. More specifically, the Liu reference does not disclose the use of the pulse shaping function characterized by the equation set forth above and in claim 22. This equation represents two parts – the requirement to the pulse shaping function to minimize the distortion of the power amplifier and a joint design of the modulator and the power amplifier. This step is important to having the ability to operate the amplifier in the saturation region where it is non-linear. Without it, the method will not work. And because the Liu reference does not disclose such a step, amended claim 22, and all claims depending therefrom, overcomes the rejection.

The specification has been amended to more accurately describe the invention. The language added to this paragraph is designed to facilitate the understanding that the modulation and demodulation through the transmitter and receiver, respectively, operate in a mirror or matched fashion. No new matter has been added by this amendment or any of the amendments to the claims.

It is respectfully submitted that this patent application is in condition for allowance, which allowance is respectfully solicited. If the Examiner has any questions regarding this amendment or patent application, the Examiner is invited to contact the undersigned.

The Commissioner is hereby authorized to charge any additional fee associated with this Communication to Deposit Account No. 50-0852.

Respectfully submitted,

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